

# THE MOSQUITOS OF THE AMAZON REGION

BY

R. NEWSTEAD, M.Sc., A.L.S., ETC.

AND

H. WOLFERSTAN THOMAS, M.D., C.M. (MCGILL)

*(Received for publication April 6th, 1910)*

(Plate XI)

Reference has already been made in this report to the general breeding-places of the various mosquitos encountered in Manáos, Brazil (pp. 17-22). Dr. Thomas has also published a short preliminary note\* on some of the Culicidae found by him in Iquitos, Peru; no details, however, are given, and the exact identifications of the species at that period were not ascertained.

The list of species recorded in this memoir embraces all the commoner kinds and a few that are new or noteworthy. It is highly probable, however, that other mosquitos await the discoverer in a region so rich in insect life, but it has been impossible hitherto, owing to pressure of official work, to extend the researches in this department of Zoology farther afield.

## *Cellia argyrotarsis* (R. Desvoidy), fig. 2.

This is undoubtedly a 'domestic' species, occurring sparingly in the dwellings of man near the swamps both in the town and its environs. It is much less common than its near ally *C. albimana*, from which it is readily distinguished by the absence of the black ring around the base of the terminal segment of the hind tarsi.

---

\* *Lancet*, September 8, 1900, p. 668.

*Cellia albimana*, (Wiedemann)

This is the Anopheline *par excellence* of the Amazon region. It is characterised by the presence of a black ring at the base of the last segment of the otherwise white hind tarsi. It is also a decidedly 'domestic' species, and is both intra-urban and extra-urban; but is naturally most abundant in the swampy regions. It bites in the day time as well as at night; but is rarely met with in the houses until after sunset.

It is the common practice among the natives of Brazil and Peru to sink tubs or barrels in the ground at or near the margins of the swamps. These receptacles fill rapidly with clear water which is used for drinking and washing purposes, and eventually become the chosen breeding place for this Anopheline. This habit is all the more remarkable seeing that the water attains a depth of three to four feet with a total absence of the higher forms of aquatic plants. We have also to record the capture of this mosquito at Itacoatiara and Brevis on the Amazon River, East of Manáos; and at Santo Antonio on the Madeira River about 600 miles S.W. of the same city.

*Stethomyia nimba*, Theobald

One example taken at Taruman Waterfall about 18 miles N.W. of Manáos, July, 1906. Seen also in the swamp near Pensador. This curious Anopheline has hitherto been recorded only from British Guiana and Pará.

*Megarhinus separatus*, Arribalzaga

Several examples of this handsome mosquito were taken at Manáos, Brazil, during the month of July, 1906. They all occurred in a reclaimed portion of the forest surrounded by swamps. These mosquitos could not be induced to feed on man; and the larvae were not discoverable.

*Janthinosoma musica*, Say

Two specimens, both females, were captured in Dr. Vigil's house at Iquitos, Peru. The residence was surrounded by low shrubs and bananas far from any natural collection of terrestrial waters; but

innumerable puddles and road-side gutters were near at hand, so that the insects may in all probability have bred in some of these.

*Stegomyia calopus*, (Meigen)

*Stegomyia fasciata* (Fab.)

This mosquito is present all the year round; there seems to be no marked seasonal prevalence. As already stated (ante, p. 17), the larvae occur everywhere, in any receptacle which will hold water for a few days. Great numbers, however, were found in large puddles in the open, in association with Anophelines and other mosquito larvae, although there were houses with suitable receptacles within 50 feet of these habitats. They occurred also in two large deep collections of terrestrial water averaging 3 feet in depth, situate at the upper reaches of two Igarapés within the limits of the city (No. 9 on map). On one occasion, swarms of larvae were found in a barrel of water containing the macerated and putrid remains of a number of frogs upon whose carcasses they seemed to have been thriving.

The females bite freely both by day as well as at night, though they are naturally much more noticeable in the day time, and they are most persistent in following man from place to place whether in sunlight or shadow.

Being desirous of confirming the experiment conducted by Mr. Theobald\* regarding the viability of the ova of this mosquito after long exposure to dry atmospheric conditions, two small consignments of eggs were forwarded to Liverpool in the year 1906. The first batch was laid on moist white filter paper; these were dried in the air and subsequently placed in a desiccator with chloride of calcium for 24 hours, and finally transmitted to England in glass tubes, tightly corked. The following data gives the results of this experiment:

September 9-11.	Eggs laid at Manaus, Amazon.
October 26.	Eggs reached England. Placed in water at a temperature of 23° C.
" 27.	12 larvae hatched during the previous night and 1 after 12 hours immersion.
" 28.	Larvae began moulting.
" 30.	All larvae completed first moult.
November 4.	Larvae pupated.
" 7.	First imago, a male, hatched. This example lived for 6 days.
" 8.	A male and female hatched.

---

\* Mono. Culicid., Vol. III, p. 6.

The breeding jar was kept in an incubator at an even temperature of 23° C. For the greater part of the time the insects were in complete darkness; but a little light was admitted occasionally during the day.

#### SUMMARY

Eggs remained dormant and practically dry 45-47 days.

#### LIFE-CYCLE

Eggs. Incubation period ... ..	6-12 hours
Larval stage ... ..	9 days
Pupal stage ... ..	3 days
Complete cycle ... ..	12-13 days

#### *Culex fatigans*, Wiedmann

Abundant everywhere in the towns and suburbs, both at Iquitos, Peru; and at Manáos, Brazil. It breeds in large numbers in almost any collection of water, but the larvae were less common in the water of flooded cellars than were those of *Mansonia titillans*.

#### *Mansonia titillans*, (Walker)

This species is as common as *Stegomyia calopus* in Iquitos, Peru. Its breeding-places are confined chiefly to the pools and puddles scattered throughout the town; it was most abundant, however, in pools along the river banks. The specimens here recorded were all captured during the first three months of the year 1906.

Examples of the adults were caught attempting to bite persons in well-lighted rooms and outside in shady places, especially between the hours of 7 a.m. and 9.30 a.m., and again in the early afternoon, but it was only at dusk that swarms of these mosquitos appeared, attacking vertebrates of all kinds. On board the ships, alongside the Muelle, the walls of the cabins were at times black with them, and they were a source of great discomfort, boldly attacking everyone and biting most viciously. The occupants of the houses along the river bank were attacked to such an extent that the residences at times

became almost untenable. In the centre of the town, fortunately, the nuisance was not so great, due chiefly to the absence of breeding-places.

In Manáos, it is found in the suburbs of the city at the pumping-station, and in the neighbourhood of some of the Igarapés. It was especially troublesome during 'high river' in the year 1908, when many of the cellars of the houses and offices situated along the low-lying land by the river front were filled with water. This *Mansonia* bred in the collections of water thus formed in large numbers, but the larvae were not found where the water had been oiled. The nuisance caused by these mosquitos was very great, and it was almost impossible to have even the early meals—breakfast and lunch—in peace.

*Mansonia pseudotitillans*, Theobald

One example, a female, agrees for the most part with the description given by Theobald,\* and is apparently referable to this species. It differs, however, in having a few *short* clavate lateral scales on the wings; but these are much shorter than in *M. titillans*, and very few of them are present. Unfortunately the anterior tarsi are wanting, so that the record must, for the present, remain a somewhat doubtful one.

*Habitat*:—Iquitos, January 13th, 1906. The capture was made in the afternoon on board the SS. 'Napo' while lying alongside the Muelle. This mosquito has not hitherto been recorded from Peru.

*Mansonia longipalpis*, n. sp. (Newstead and Thomas)

(Plate XI, figs. 5, 5a)

*Female*. Palpi long (fig. 5). Thorax clothed with golden ochreous scales; posterior region black. Abdomen blackish with lateral patches of creamy-white scales. Legs distinctly speckled; hind tibiae white with a black band. Wings with a double dense black bar at base.

Length, 4.45 mm. Length of detached wing 5 mm.

\* Mono. Culicid., Vol. II, p. 171.

*Head scales.* Upright forked, black; narrow curved, pale ochreous with golden reflections; flat, creamy white.

*Palpi* (Plate XI, fig. 5). A little more than one-third the length of the proboscis; tips clothed with white scales; the remaining scales mixed creamy white, pale ochreous and blackish.

*Proboscis* with an incomplete central band of creamy-white scales; the scales on the ventral surface of the pale area black, those on the remaining portion of the proboscis blackish with pale ochreous ones intermixed.

*Thorax* with golden ochreous scales intermixed with a few black ones in front; those over the insertion of the wings very long and whitish; region in front of the scutellum semi-nude, blackish-brown with a well defined median group of black scales; pleurae clothed with flat (some almost spindle-shaped) creamy white scales.

*Abdomen.* Blackish with a few creamy-white scales at the base of the segments; and lateral sub-triangular patches of creamy-white. Apical margins of all the segments with a fringe of very long golden brown hairs.

*Legs* black or brownish-black; conspicuously speckled with bright ochreous yellow; last segment of the anterior tarsi with an inconspicuous band of dull ochreous; *mid tarsi*: apex of 2nd, basal two-thirds and apex of third, and the whole of the 4th and 5th ochreous white; *hind tarsi*: apex of 2nd, the whole of the 3rd; base and apex of the 4th and the whole of the 5th ochreous white.

*Wings* densely clothed with blackish and creamy white scales, the former predominating; base of costa, sub-costa, and first longitudinal vein, black. Fringe smoky-grey. Outstanding scales (Plate XI, fig. 5a) more than twice the length of the broad spatuliform ones, and considerably longer than those in *Mansonia titillans* (fig. 4a).

The distinguishing features of this insect are the abnormally long palpi, the colour of the hind tarsi and the great length of the outstanding scales of the wing. It is a large and very characteristically marked insect, and may from the character of the palpi form the type of a new genus.

*Habitat*:—Four females, all taken at a large residence at the pumping station standing at a considerable elevation and surrounded by woods and swamps. It is one of the coolest spots in the immediate

neighbourhood of Manáos. They were all taken between the hours of 5 and 5.30 p.m. during the month of August, 1906 and 1907.

*Uranotaenia geometrica*, Theobald

(Plate XI, fig. 3)

This very handsome mosquito was commonly found in the neighbourhood of swamps and large puddles within the city of Manáos and also in its environs. It was usually associated with *Culex fatigans*, *Cellia albipes*, and occasionally with *Stegomyia calopus*. At Iquitos, Peru, it was also common in the swamps near the villages of San Juan and San Miguel.

The majority of the specimens were captured out of doors; but it occurred, not infrequently, in dwelling-houses and also in the Hospital da Portugueseza Beneficente, Manáos. For details regarding the distribution of this mosquito in the latter locality, see map opposite p. 54.

Goeldi in his delightful memoir\* makes no reference to this insect. The type, however, was caught by Dr. Lutz at Cubatao, near Santos, Brazil. Dr. Lindenberg† also records this species from Manáos; but there is apparently no previous reference to its occurrence at Iquitos, Peru.

*Uranotaenia pulcherrima*, Arribalzaga

This beautiful little species occurs freely at the swamps along the Igarapé Castelhana, especially so in the one by the old cemetery, Manáos. The locality is a new and hitherto unrecorded one.

*Uranotaenia lowii*, Theobald

*Habitat*.—Flores and Pensador swamps, near Manáos. It occurs also within the limits of the city at the Cearense swamp and near the Power House of the Electric Tram system. Specimens were captured during the months of July and August, 1906, 1907.

*Neomelaniconion chrysothorax*, n. sp., (Newstead and Thomas)

Anterior half of thorax densely clothed with golden scales. Abdomen brown to brownish black with pale fringes. Legs bronzy brown or smoky brown (in subdued light); femora paler but black apically on the dorsal surface.

\* Os Mosquitos no Pará.

† Mosquitos do Brazil.

*Female. Head scales:* Upright forked ones pale ochreous to pale golden yellow in front, those on the nape black; flat scales pale ochreous, those on the lower portion of the head dusky white.

*Thorax* dark brown, clothed to a point near the insertion of the wings with large narrow curved golden bronzy scales. Posterior portion, with a narrow median black line and a central patch of minute narrow scales on the otherwise bare integument; posterior angles of meso-thorax with numerous long hairs; and there are many similar hairs on the scutellum.

*Abdomen.* Scales dark and pale brown, presenting a faintly freckled appearance under the microscope, the dark scales preponderating; apical margins with pale ochreous scales, giving the segments under a low magnification a faintly banded appearance, but this characteristic disappears under a higher magnification. Apical marginal hairs, whitish; sides, with lateral pale angular basal spots. Venter with distinct broad pale apical bands.

*Legs* coppery brown; femora whitish beneath.

*Wings* strongly hyaline, scales uniformly pale brown. Length 2.25 mm.

*Male.* Closely resembling the female; but the thoracic scales are slightly brighter or more golden, and the apical bands on the abdomen are also more distinct.

*Habitat:*—Iquitos, Peru. Several specimens caught in the centre of the town, but within 250 yards of swamps; February and March, 1906. Examples were also taken in the suburbs of Manáos at the old Pumping Station; at Flores, Pensador; and at the swamp near the Portuguese Hospital, June and July, 1906-1907. It would appear, therefore, that this insect may be met with from February to July, and in all probability at other seasons also.

One of the marked characteristics of this mosquito is the sudden line of demarcation between the golden scales of the anterior half of the thorax and the dark semi-nude portion behind the insertion of the wings.

*Limatus durhami*, Theobald

A single female of this well marked species was taken at Iquitos, Peru, March, 1906. It occurred in a dwelling-house situate at the margin of the very extensive swamps in the neighbourhood of the



'Noria' Spring. It is noteworthy that the specimen in question was caught while biting its captor; and that there were no wild-pines (Bromeliacea) anywhere in the neighbourhood. This record is an interesting one, as it is a new addition to the Culicid Fauna of this region.

#### TABANIDAE

We add here the records of the capture of two species of Tabanidae. No efforts were made to collect these insects, as they require searching for in localities beyond the limits of the districts in which the work of the expedition was conducted.

##### *Erephopsis brevistria*, Lutz

Two examples, both females, were captured near Manáos at the Taruman Waterfall, 25.VI.06. They agree best with the description given by Lutz;\* but the examples are rather 'worn,' so that it is somewhat difficult to fix all the specific details.

##### *Lepidoselaga lepidota*, (Wiedemann)

This common and widely distributed species is abundant in all suitable places between Manáos and Iquitos, coming on board the vessels in the river between these two places. It is a very striking insect, and owing to the sudden line of demarcation of the black wing markings it is known generally to Europeans as the 'short jacket'. In the immediate neighbourhood of Manáos it is commonest during the dry season, May to December, and is a persistent and vicious biter.

---

\* Tabaniden Braziiliens. Zool. Jahr. Supp. X., 1909, p. 643.

## EXPLANATION OF PLATE XI.

- Fig. 1.—*Stegomyia calopus*. The carrier of Yellow Fever.  $\times 10$ , and natural size, about. (Page 143.)
- Fig. 2.—*Cellia argyrotarsus*.  $\times 10$ , and natural size, about. (Page 141.)
- Fig. 3.—*Uranotaenia geometrica*.  $\times 10$ , and natural size, about. (Page 147.)
- Fig. 4.—Head of *Mansonia titillans*.  $\times 10$ . (Page 144.)
- Fig. 4a.—Wing scales of *Mansonia titillans*. Magnified. (Page 144.)
- Fig. 5.—Head of *Mansonia longipalpis*, n. sp.  $\times 10$ . (Page 144.)
- Fig. 5a.—Wing scales of *Mansonia longipalpis*. Magnified. (Page 145.)

